UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA

April 25, 2019

Stephen Banister, Acting Lead Remedial Project Manager
US Department of the Navy
33000 Nixie Way, Bldg 50
San Diego, CA 92147

Dear Mr. Banister:

Thank you for providing for review the following Navy drafts relating to the Former Hunters Point Naval Shipyard, San Francisco, California (Site):

1. November 21, 2018, *Draft Report of Soil Remedial Goals and Estimated Excess Cancer Risk Relationships*
2. November 21, 2018, *Draft Report of Structure Remedial Goals and Estimated Excess Cancer Risk Relationships*
3. November 27, 2018, *Revised Risks at RGs using EPA Calculator – Soil and Structures*
4. December 13, 2018, *Revised Risks at RGs using EPA Calculator – Soil and Structures*

The U.S. Environmental Protection Agency (EPA) has reviewed these drafts and discussed them with the Navy verbally at multiple productive conference calls. We appreciate that the revisions indicate that the Navy made significant changes to adopt the recommendations of EPA. Attached are EPA written comments to follow up on these conversations.

To supplement other EPA previous comments, in EPA's April 11, 2019, letter, we recommended that the Navy issue for public and regulatory agency comment a draft technical memorandum to supplement the July 9, 2018, draft *Five-Year Review.* This document should include revised versions of the first two documents listed above that show draft Preliminary Remediation Goal (PRG) Calculator assessments for onsite soil (trenches and building sites) and buildings (commercial scenario). [1] The revisions should also reflect calculations more similar to the December 13, 2019, versions of the PRG Calculator assessment, which incorporated more of

[1] EPA previously submitted comments September 21, 2019, on the July 9, 2018, draft *Five-Year Review*, which did not include PRG Calculator assessments, and April 11, 2019, to recommend a process for finalizing the *Five-Year Review and* the *Parcel G Removal Site Evaluation Work Plan* (*Work Plan*) in a transparent manner that protects public health and moves forward efficiently with field work. See https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.scs&id=0902722&doc=Y&colid=37700&region=09&type=SC

EPA comments provided prior to that date. Please incorporate the attached comments into the forthcoming draft technical memorandum as well.

We look forward to working with the Navy to finalize the *Five-Year Review* and the *Work Plan* and other associated documents and begin the testing component of the radiological assessment effort as soon as possible. If you would like to discuss any of these comments, please contact me at 415-947-4187 or lee.lily@epa.gov. You can also Contact John Chesnutt, Manager, Pacific Islands and Federal Facilities Section, at 415-972-3005 or chesnutt.john@epa.gov.

Sincerely,

Lily N. Lee
Remedial Project Manager
Superfund Division

Attachment

USEPA Review of these Navy drafts about soil:

- **November 21, 2018, *Draft Report of Soil Remedial Goals and Estimated Excess Cancer Risk Relationships (Soil Report)*, Former Hunters Point Naval Shipyard, San Francisco, California (Site)**
- **November 27, 2018, *Revised Risks at RGs using EPA Calculator – Soil and Structures***
- **December 13, 2018, *Revised Risks at RGs using EPA Calculator – Soil and Structures***

Comments dated April 25, 2019

GENERAL COMMENT

1. **Site-Specific Input Parameters:** The current Record of Decision (ROD) Remedial Goals (RGs) can be evaluated using the EPA Preliminary Remediation Goal (PRG) Calculator in a "2-D external exposure" residential scenario or, alternatively, using a "soil" residential scenario where the following assumptions are made:

    a. GSF_O= 0 centimeters (cm), which means assuming no clean cover for those portions of the site where this is relevant.
    b. GSF_B=0 cm, which means no foundations are present for those portions of the site where this is relevant.
    c. Soil Ingestion = 0.000001
    d. Soil Inhalation = 0.000001
    e. As = 420 acres (based on area of portions of the site above water that are intended for development)

2. **Consumption of Homegrown Produce:** In the technical memorandum, we suggest referencing these documents for parcels already transferred that create an enforceable requirement that any future homegrown produce can only be in raised beds: Records of Decision, Land Use Control Remedial Designs, Risk Management Plans, and Covenants to Restrict Use of Property (CRUPs). The current CRUP for Parcels D-2, UC-1, and UC-2 require a barrier at the bottom of the raised beds for trees that will not allow roots to penetrate below the Durable Cover. As EPA discussed with the Navy and others on a teleconference call February 22, 2019, the State of California Department of Toxic Substances Control (DTSC) has recommended amending this CRUP and other future CRUPs to incorporate template language used statewide that prohibits growing any edible items beneath the Durable Cover unless grown in raised beds or containers (above the Durable Cover) with imported clean soil and with a bottom that prevents the roots from penetrating the Durable Cover. Because some plants have roots that might penetrate deeper than a typical raised bed,[2] EPA also recommends that this requirement

[2] Though for some plants, roots may concentrate close to the surface, some plant roots extend deeper. See, for example, Fan, McConkey, Wang, and Janzen, "Root distribution by depth for temperate agricultural crops," Field Crops Research, Volume 189, 15 March 2016, Pages 68-74. This paper states the following: "Effective root zone is the depth within which most crop roots are concentrated, which was estimated as ∼50–100 cm for wheat, maize, barley and canola, as ∼60–70 cm for peas, as ∼120 cm for alfalfa (ARD, 2013)." (https://www.sciencedirect.com/science/article/pii/S0378429016300399)

be extended to all plants, not just trees, and be made clear in all relevant enforceable documents.

3. **Potential for post-ROD change:** The current ROD soil RG for Th-232 is 1.69 pCi/g. The Navy's draft December 13, 2018, *Revised Risks at RGs using EPA Calculator – Soil and Structures* showed this value to be associated with an estimated cancer risk of 1.7 x 10^-4. A soil PRG of approximately1 pCi/g would be associated with an estimated cancer risk of 1 X 10^-4. After incorporating comments from regulatory agencies and the public, the PRG Calculator assessment may change. In addition, the Navy will conduct a new radiological soil reference background study that will produce more reliable results for naturally occurring levels Th-232.

   At this time, no reliable evidence is available to establish whether the site contains radiological materials that exceed an estimated cancer risk of 1X10^-4, above background, beyond a *de minimis* amount. Retesting will give new, reliable data to allow that determination. The radiological soil testing and, if needed, cleanup work plans for Parcel G and all other relevant parcels should clearly state that the rework will use a concentration for all radionuclides associated with 1 X 10^-4 risk, above background, as a threshold for cleanup actions. The assessment of the risks associated with the current ROD RGs may change after addressing comments. For purposes of discussion, if the December 13, 2018, assessment were the final conclusion, then in this scenario, the Parcel G Work Plan would test for and clean up any soil where Th-232 was found above 1 pCi/g above background. This level is more protective than the current ROD soil RGs.

   If, in this scenario, the new testing at the Site finds levels of Th-232 that exceed the sum of the new reference background levels plus 1 pCi/g, then a post-ROD change formal process will be needed to change the remedy for it to be protective. Remedy changes can include changes in exposure, e.g. through institutional controls, in addition to changes in cleanup thresholds. Per the EPA's *Comprehensive Five-Year Review Guidance*,[3] if no soil is found that exceeds this value, then no post-ROD change formal process will be needed. The same approach would apply to the Buildings RGs: if testing shows that there is no contamination in the buildings that exceeds health protective levels using new PRG calculations and new reference background results, then no post-ROD change would be necessary.

   If exceedances of the new PRGs are found during retesting, EPA will work with the Navy and other regulators to evaluate whether meeting these new PRGs would result in a minor, significant, or fundamental change in scope, cost, or performance of the cleanup. This evaluation will follow EPA Guidance.[4] Then for all relevant parcels, the ROD remedies will need to be changed through an appropriate corresponding post-ROD change process, which could be a Memo to the File, an Explanation of Significant Differences (ESD), or a ROD Amendment, along with the associated public involvement process. In this scenario, EPA can explore ways to facilitate the rework to move forward

[3] EPA, OSWER 9355.7-03B-P, *Comprehensive Five-Year Review Guidance*, Appendix G, 2001.
[4] EPA, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, EPA 540-R-98-031, OSWER 9200.1-23P, PB98-963241, July 1999.

using the new PRGs while completing the necessary post-ROD change process simultaneously moves forward in parallel.

4. **Import Fill:** EPA understands the following: Fill material often has variation in concentration within it. Naturally occurring levels of Th-232 can vary greatly. For example, soil from the Sierra may contain higher concentrations of Th-232 than local soil due to naturally occurring radiation from granite. Much of the import fill to Site has come from soil removed to build BART tunnels under the SF Bay. Cleanup sites commonly use ROD RGs as criteria for import fill. As EPA discussed with the Navy and others on a teleconference call February 22, 2019, this Site also similarly uses the ROD RGs as criteria for import fill. Note that the import fill criteria do not specify consideration of any reference background values for any radionuclides except Ra-266.

   Regarding past import fill, we recommend that the Navy provide regulatory agencies with data regarding radiological characterization of import fill already received at the Site. We will review these data to see if any import fill shows concentrations of radionuclides that exceeded a level associated with an excess cancer risk of 1X10^-4.

   Regarding potential future import fill, we recommend that the Navy revise any relevant documentation about import fill criteria to ensure that radionuclide concentrations will not exceed levels associated with an estimated cancer risk of 1X10^-4. Examples include the draft import fill criteria in Worksheet 15.8 in the Parcel E Remedial Action Work Plan and the similar Worksheet in the Parcel G Work Plan Addendum.

5. **Responses to Comments and Responsiveness Summary:** As stated in EPA's April 11, 2019, letter, we recommend that the final *Five-Year Review* include formal detailed Responses to Comments from regulatory agencies and a responsiveness summary to substantive comments from the public. OSWER's 1990 Directive on "Superfund Responsiveness Summaries"[5] gives more specific information about this additional process. For example, here are some relevant excerpts: "A responsiveness summary should reflect a genuine attempt to come to grips with citizens' questions and concerns…" A responsiveness summary is important, because "it provides the decision-maker with information about the views of the public…" and "it documents how comments have been considered…" On April 23, 2019, EPA sent to the Navy comments received by EPA from members of the public after September 14, 2019, about the July 9, 2018, draft *Five-Year Review*. Please include as part of the Responsiveness Summary the consideration of these and any other substantive comments from the public that the Navy has received.

6. **RESRAD Dual Analysis:** The Navy's March 15, 2019, letter proposed to use RESRAD in lieu of EPA's Preliminary Remedial Goal (PRG) Calculator to evaluate the protectiveness of the remedies in the *Five-Year Review*. Although we typically recommend use of the PRG Calculator, we can consider other tools through consultation

[5] OSWER Directive No. 9230.0-06, Superfund Responsiveness Summaries, Superfund Management Review: Recommendation #43E, 1990.

with our headquarters office, in accordance with EPA Guidance, especially Q10, Q16, and Q36.[6] Here is a relevant excerpt of that guidance:

> "If there is a reason on a site-specific basis for using another model justification for doing so should be developed. . . . The justification normally would include the model runs using both the recommended EPA PRG model and the alternative model. . . . the user should adjust the default input parameters to be as close as possible to the PRG inputs, which may be difficult since models tend to use different definitions for parameters."

SPECIFIC COMMENTS

1. **Section 2.0, Use of the PRG Calculator, Page 3, Bullet 2:** If the site is capped, then a two dimensional (2D) External Exposure scenario with decay may be appropriate.

2. **Section 2.0, Use of the PRG Calculator, Page 3, Bullet 3, Database Hierarchy Defaults:** As discussed in teleconference calls with the Navy in summer and fall, 2018, the EPA Preliminary Remediation Goal (PRG) Calculator Users Guide recommends the following for the PRG calculator options for Initial Input Parameters:

   a. Ra-226 and Th-232 are long-lived radionuclides. The half-life of Ra-226 is 1600 years. Therefore the parent will continue to produce decay products that also contribute to health hazards in the long term. Therefore, the PRG Calculator for these radionuclides should be run using Site Specific, Database hierarchy defaults, which "Assumes secular equilibrium throughout chain (no decay)."

   b. Cs-137, Sr-90, Pu-239, and U-235 have shorter half-lives, so the production of decay products by the parent radionuclides will decrease over time. Therefore it would be appropriate for these to be run using Site Specific, User-provided alternate assumptions by selecting "Does not assume secular equilibrium, provide results for progeny throughout chain (with decay)" where:

      i. Cs-137 (Ba-137 T1/2 is changed to Cs-137 T1/2),
      ii. Sr-90 (Y-90 T1/2 is changed to Sr-90 T1/2),
      iii. Pu-239 (U-235m T1/2 is changed to Pu-239 T1/2), and
      iv. U-235 (Th-231 T1/2 is changed to U-235 T1/2)

   c. Am-241, Co-60, H-3, Eu-152, and Eu-154 can be run using Site Specific, Database hierarchy assumption "Does not assume secular equilibrium, no progeny included (with decay)"

[6] For guidance on this approach, see Q10, Q16, and Q36 in OSWER Directive 9285.6-20, "Radiation Risk Assessment at CERCLA Sites: Q & A," June 2014. Also see the Federal Facilities Agreement (FFA) sections 6.1 and 7.7b, which includes the Navy's commitment to follow EPA guidance.

Also, the half-lives of the progeny should be changed to match the longer-lived parent; this is necessary to generate PRGs at a designated risk that are not at a higher concentration.

3. **Section 2.0, Use of the PRG Calculator, Page 3, Bullet 11, clean soil thickness for GSFo:** For portions with an asphalt cover, the Remedial Design requires the cover to have at least a 2 inch thick layer off asphalt and at least a 4-inch thick layer of aggregate base concrete. EPA agrees that this configuration of materials provides a level of shielding equivalent to 20 cm of clean soil instead of 0 cm. We suggest that you explain this reason for this assumption in the technical memorandum, and we can provide upon request a calculation demonstrating this equivalency.

4. **Section 2.0, Use of the PRG Calculator, Page 4, Bullet 12:** The basis for selecting a 0.5 acre area and for 0.5 vegetative cover is unclear. Please explain.

5. **Section 2.1.1, Branching Fraction, Page 4:** The branching fraction is included in the PRG Output option "Secular Equilibrium." For longer lived radionuclides it would make more sense to use this output option. Please use the Secular Equilibrium output option for Ra-226 and Th-232.

6. **Section 2.1.1, Branching Fraction, Page 5:** The decay chain tool at year zero is modelling the parent without daughters with ingrowth over time. For naturally occurring isotopes, it would be better to start when the daughters have all grown in. Previous sample results have already shown that the longer-lived radionuclides have progeny that are in secular equilibrium for the natural decay series. Please ensure that ingrowth of daughter products is incorporated.

7. **Section 3, Estimated Excess Cancer Risks at the 2006 Soil Remediation Goals, Table 2 (continued) External Exposure Risk Column, Page 8:** It appears that the External Exposure output from the PRG calculator is missing from this table and that the column labeled "External Exposure Risk is actually "Total" risk. Please ensure that the external exposure output is included and that the total risk entries are in the correct column.

8. **Section 3, Estimated Excess Cancer Risks at the 2006 Soil Remediation Goals, Table 2 (continued) External Exposure Risk Column, Page 8:** The actual output from the PRG calculator should be included in the Draft Soil Report, including "inputs" and the date that the run was conducted. Please include the actual PRG calculator output as an attachment to the Draft Soil Report.

EPA Review of these Navy drafts:

- **November 21, 2018, Draft *Report of Structure Remedial Goals and Estimated Excess Cancer Risk Relationships (Structures Report)*, Former Hunters Point Naval Shipyard, San Francisco, California**
- **November 27, 2018, *Revised Risks at RGs using EPA Calculator – Soil and Structures***
- **December 13, 2018, *Revised Risks at RGs using EPA Calculator – Soil and Structures***

Comments dated April, 2019

GENERAL COMMENTS

1.Independently evaluate risks for fixed vs. removable contamination: The current RODs assign an RG for removable contamination as 20% of the RG for fixed contamination. It could be appropriate, however, to evaluate PRGs for each independently. A scenario for removable contamination only (using 20% of the RG) could be run by itself, and ingestion would be the driver vs. external exposure. For fixed, external exposure would be the driver vs. ingestion. Evaluations of the PRG associated with a 1 X 10 ^-4 cancer risk could be evaluated separately. The associated testing sensitivity could also be evaluated separately. To test for removable, swipes would be taken of the building and results would be analyzed by Ludlum 3030p to meet MDC of the BPRG value or sent for analysis if field instrumentation cannot meet BPRG values. Similarly, the testing sensitivity required for alpha/beta scan and static measurements could be developed based on the above independent scenario for fixed contamination. That being said, EPA has previously made comments about combining risks from multiple Radionuclides of Concern (RoCs).[7] Similarly, please discuss the combination of risks associated with potential presence of both fixed and removable contamination in the sample location.

2. The BPRG Calculator Users Guide recommends site specific model inputs. For buildings with a future commercial or industrial use, an "indoor worker" scenario is appropriate. For buildings with a future residential use, then a "resident" scenario is appropriate. Different cleanup levels and testing sensitivity can be applied accordingly.

3. These comments already made on the draft Soil Report also apply to the draft Structures Report: General Comments 3, 5, and 6 and Specific Comments 2, 5, 6, and 8.

SPECIFIC COMMENTS

1. **Section 1.0, Introduction, Page 3:** The Building Preliminary Remedial Goals (BPRG) calculator was originally issued in August 2007, not 2006 or earlier as implied in the second paragraph of the Introduction. Please revise this paragraph for clarity.

[7] See the following: EPA's September 21, 2018 comments on the draft *Fourth Five-Year Review*, General Comment 2b; EPA's August 14, 2018 comments on the draft *Parcel G Removal Site Evaluation Work Plan*, Specific Comment 6 (Section 3.3 and 4.3, Remediation Goals for soil and buildings, respectively), and Specific Comment 15c (Section 4, Building Investigation Design and Implementation).

2. **Section 2.0, Use of the BPRG Calculator, Page 3:** It could be appropriate to use these default assumptions in the model: EThard= default (6 hours) for both adult and child and ETsoft=default (10 hours) for both adult and child. Carpets/rugs, curtains, and other soft surfaces will likely be in buildings once occupied. Also, the total time in the building will be 16 hours total for a resident 8 hours.

3. For room size, the floorplans of current residential development on Parcel A show rooms that are 10x10x10, so this may be the most appropriate room size for a residential scenario.

4. For risk of Ingestion to dust using the 20% RG values of dpm/100cm2 and converted to pCi/cm2, please use the same equilibriums as discussed above and use the same “Other Input Parameters” as listed above.

5. **Section 2.1.2, Radon Emission Factor, Page 5:** Terms are being confused in this section. Radon emanation (actually, radon exhalation is what is being described) is dependent on many factors: soil moisture, density of the soil, soil type, distribution of radium, etc. This would have to be a site specific value, rather than a factor and may change as soil moisture changes seasonally. Please propose use of a site-specific value for radon emanation.

6. **Table 1, Radionuclide Activities Inputs to EPA BPRG Calculator, Page 7:** For Th-232, the radon emanation factor should be 0.02, not 0.01. Please correct this error.

7. **Section 2.3, Dissipation Rate Adjustment, Page 7:** It is unclear how treatment with strippable coating or paint thinner is related to normal cleaning, and transfer of radioactive contamination to skin or clothing. In addition, the Navy should determine if a simple soap and water wash will remove dust (i.e., removable) contamination, and then only fixed contamination would need to be addressed. Please explain how treatment with strippable coating or paint thinner is related to normal cleaning and transfer of contamination to skin or clothing. In addition, please ensure that the Parcel G Work Plan proposes testing a soap and water wash to see if dust (removable) contamination can be addressed.

8. **Section 2.3, Dissipation Rate Adjustment, Page 7:** The Draft Structures Report should include minimum detectable concentrations (MDC) calculations that verify 1-minute static counts are sufficient to meet release criteria at the 95% confidence interval. Please provide the MDC calculations.

9. **Section 2.3 Dissipation Rate Adjustment, Table 2. Pre- and Post-Treatment Results for Concrete Floors and Walls (NAVFAC, 2018), Page 8:** Table 2 and the calculations for the “k” constant are based on work done in Building 5/5A at Alameda Point, but this is not an appropriate surrogate for buildings in Hunters Point Parcel G. For example, Building 5/5A is much larger than any of the buildings in Parcel G and it is unclear whether the Parcel G buildings are of similar age and construction.

10. **Section 2.3, Dissipation Rate Adjustment, Table 2, Pre- and Post-Treatment Results for Concrete Floors and Walls (NAVFAC, 2018), Page 8:** For reference, here is some of the BPRG User Guide text on dissipation rate (highlighting added):

> **4.3.8 Dissipation Rate Constant (k).** In some circumstances, the load of dust on a contaminated surface, to which receptors are exposed, may decline over time. Dissipation of dust may result from cleaning, and transfer to skin and clothing. Different surfaces may be cleaned at different rates and any dissipation rate used should consider a representative cleaning frequency. To determine whether dissipation is a factor at a given site, the site manager should establish whether a significant reservoir of contaminated dust is present. Such reservoirs may function as sources of dust and negate the impacts of dissipation mechanisms. In fact, indoor concentrations of contaminants may be enhanced above their original outdoor source levels after repeated transfer inside (Paustenbach, Long, et al). The recommended first step in identifying the presence of a reservoir is to examine site history. If a waste site was created through disposal, deposition or equipment leaks over an extended period of time, then the contaminant may have seeped deep into the surface. Porous surfaces such as cement or wood are also more likely to have subsurface contamination. When reservoirs are less likely to exist, such as at sites where contamination is the result of a single spill, dust cloud or event, it may be more important to account for dissipation of surface loads. For fixed contamination in building materials, or on material surfaces, in the 3-D equations, the dissipation term is not included as dissipation is not expected.
>
> The recommended default value for the dissipation rate constant is 0.0. This assumes that a contaminant reservoir is present. However, the variable is adjustable in the recommended BPRG calculator. If a dissipation rate constant is used, it is generally assumed that the dust was deposited as a one-time event (i.e.; dust cloud). Also, if a dissipation rate is applied, it is assumed that it is applicable from the point in time the recommended BPRG is calculated into the future. The discussion below provides a review of the literature related to this issue and provides an alternative dissipation rate constant value. Site specific dissipation rate constants can be used. This equation is for values of k that are greater than 0; when k=0, the dissipation term is not quantified to avoid division by zero. See the following text."

11. **Section 2.3, Dissipation Rate Adjustment, Table 2, Pre- and Post-Treatment Results for Concrete Floors and Walls (NAVFAC, 2018), Page 8:** The Dust (Ingestion) PRGs calculated using the default assumptions and no k value are very hard to quantify at the 95% confidence internal. It may be prudent to identify if a "k" value could be used based on a single cleaning to remove "Dust" contamination with a simple cleaning solution (soap and water). Please propose a test to see if a single simple cleaning reduces the amount of dust.